

1   **ABSTRACT OF THE DISCLOSURE**

2           A gain controller has a tunable filter, a power detector and a filter  
3       controlling unit. The amplifier is connected in series in a major optical channel.  
4       The tunable filter is connected in parallel to the major optical channel to select a  
5       specific light signal from an output terminal of the amplifier and then output the  
6       specific light signal to the input terminal of the amplifier. The power detector and  
7       filter controlling unit is connected between an input terminal of the amplifier and  
8       the tunable filter to control the tunable filter output. The tunable filter outputs a  
9       light signal to the input terminal of the amplifier to maintain the input power of  
10      the amplifier. Therefore, gain of each light signal from the output terminal of the  
11      amplifier can be kept in a valuable range.